



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/814,212	03/31/2004	Daoqiang Lu	INTEL8 (P17774)	6013
6980	7590	04/20/2005	EXAMINER	
TROUTMAN SANDERS LLP BANK OF AMERICA PLAZA, SUITE 5200 600 PEACHTREE STREET, NE ATLANTA, GA 30308-2216			CLARK, JASMINE JHIHAN B	
			ART UNIT	PAPER NUMBER
			2815	

DATE MAILED: 04/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/814,212	Applicant(s) DAOQIANG LU	
	Examiner Jasmine J. Clark	Art Unit 2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) ____ is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 27-32 is/are allowed.
- 6) ☒ Claim(s) 1, 7, 10, 13 and 33-35 is/are rejected.
- 7) ☒ Claim(s) 2, 4-6, 8, 9, 11, 12, 14-21 and 24-26 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>07/13/04</u> . | 6) <input type="checkbox"/> Other: ____ |

Information Disclosure Statement

1. The IDS filed 07/13/04 has been fully considered.

Specification

2. Claims 33-35 are objected to because of the following informalities: in claim 1, line 5, change "a parallal" to – parallel--. Appropriate correction is required.

Note: Claims 34 and 35 should depend on claim 33 not 32.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3, 7, 10, 13, 22, 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matayabas, Jr. et al. (US 6,597,575 B1).

Matayabas shows a structure of a device, comprising a heat spreader 6 (see column 3, lines 31-32); a silicon die 2 (see column 6, line 66), and a thermal interface material 7(TIM) disposed between the heat spreader 6 and the silicon die 2 comprising a plurality of metals (see column 6, line 29). While the plurality of metals capable of forming a transient liquid phase bond is not clearly taught, it is inherently present or certainly would have been obvious to form polymer/metal (see abstract) simultaneously

Art Unit: 2815

with conductive filler, thereby forming a transient liquid phase bond in the device, as is very well known.

3. Claims 33-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiu (US 6,519,154 B1) in view of Matayabas, Jr. et al. (US 6,597,575 B1).

Chiu shows a structure including a system comprising a processor 10 comprising a thermally conductive package cover 360 (see column 4, lines 59-60) which serves as a heat spreader; a silicon die 340 (column 4, line 4), and a thermal interface material (TIM) 370 disposed between the heat spreader and the silicon die 340 comprising metals; and a parallel data bus 305 coupling the processor to at least one input/output device (please see column 7, lines 20-25, and see claim 12, eg.). While the plurality of metals capable of forming a transient liquid phase bond, please see the above discussion in paragraph 2 under Matayabas.

Concerning claim 34, the applied reference fails to teach and/or suggest wherein the thermal interface material comprises a metal selected from for example, copper. Matayabas teaches employing copper for the TIM. Hence it would have been obvious to practice using copper for the TIM for the reasons as taught by Matayabas.

Concerning claim 35, the system of claim 33 further comprising a volatile memory, please see Fig. 6.

3. Claims 2, 4-6, 8, 9, 11, 12, 14-21, 24-26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The applied reference fails to teach and/or suggest the limitations as set forth in claims 2, 4-6, 8, 9, 11, 12, 14-21, and 24-26.

4. Claims 27-32 are allowed.

The following is an examiner's statement of reasons for allowance: the applied reference fails to teach and/or suggest a method comprising:

depositing a first metal on a silicon die and a heat spreader;

depositing a second metal on the first metal; wherein the bonding temperature of the heat spreader to the silicon die is less than the melting temperature of the first and the second metals.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

References Cited

5. Paulonis et al. (US 3,678,570), Wilcox et al. (US 5,038,996), Ueda (US 5,242,099), Spencer 2004/0050912 A1), and Ryan (US 4,700,881) teach relating to bonding of materials by the transient liquid phase.

Telephone Inquiry Contacts

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jasmine J. Clark whose telephone number is (571) 272-1726. The examiner can normally be reached on Flex.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jjbc/04/13/04

**JASMINE CLARK
PRIMARY EXAMINER**

A handwritten signature in black ink, appearing to read 'Jasmine Clark', is written below the printed name and title.